

*Ohio*

**UNION STEAM AND WATER**

**HEATING APPARATUS,**

FOR

**Warming and Ventilating**

*Private Residences, Public Buildings and Institutions, School  
Houses, Churches, Stores and Railway Stations.*

AS ERECTED BY

**MURRAY & WINNE,**

No. 114 Dearborn St., CHICAGO.

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**MURRAY, WINNE & BAILEY,**

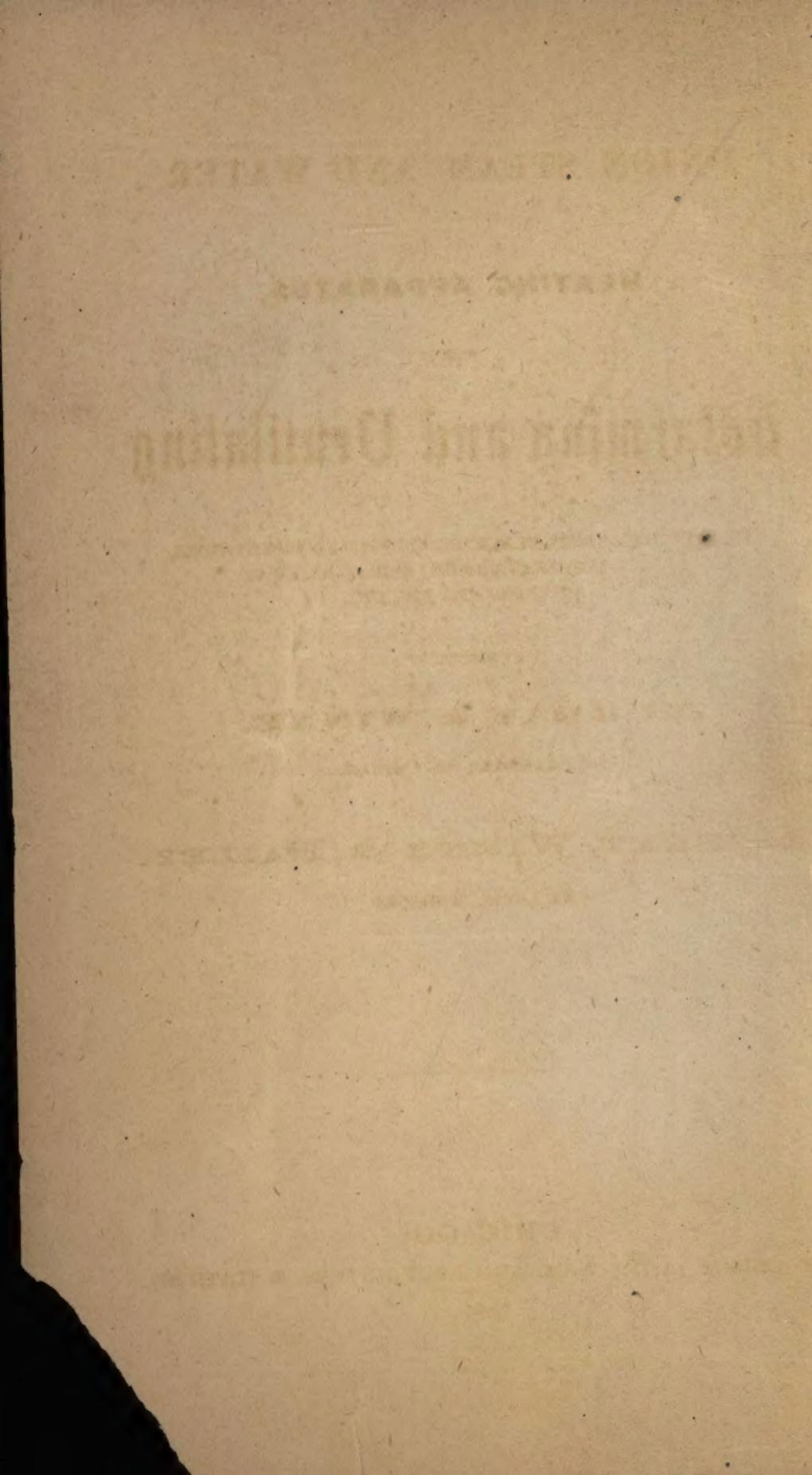
ST. LOUIS, - - - MISSOURI.

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CHICAGO:

ROUNDS & JAMES, BOOK AND JOB PRINTERS, 46 STATE ST.

1866.



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SCHOOL HOUSES CHURCHES, STORES, RAILWAY  
STATIONS, ETC., ETC., ETC.

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THEATRUM MUSICO-MATHEMATICUM

BY GUTTERSON & CO. LTD.

1866.

INITIALLY BY THE PUBLISHERS

FOR THE USE OF SCHOOLS AND COLLEGES  
AND FOR THE INFORMATION OF STUDENTS  
IN ALL BRANCHES OF LEARNING.

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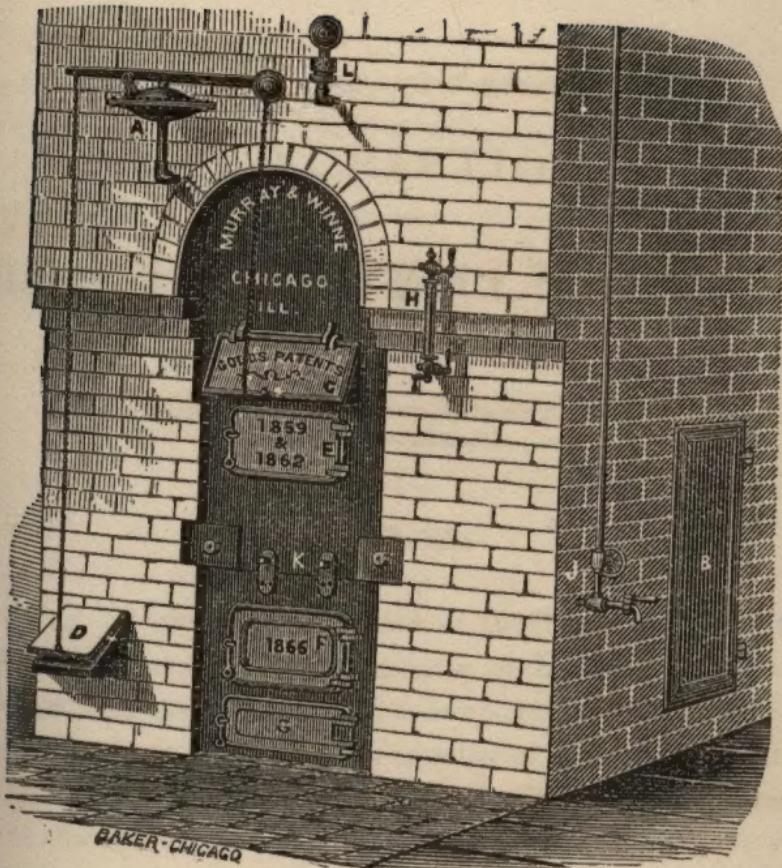
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TDCAT 1866

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### **SECTIONAL BOILER.**

- A**—Automatic Regulator, opening and closing doors C and D at the proper moment, to keep the fire uniform and regulate the pressure of steam.
- B**—Door opening to boiler under radiators.
- C**—Door opening to 10 three-inch flues, for cleaning them out and for regulating fire.
- D**—Draft door.
- E**—Feed-door for coal.
- F**—Door opening to fire-grate on which the fire is dumped, and where the ashes are separated from the coal, and drop to ash-pit below.
- G**—Door of ash-pit.
- H**—Glass water-gauge showing height of water in boiler.
- J**—Service-cock, to draw water out of boiler.
- K**—Position of fire-grate.
- L**—Safety-valve.



## **DESCRIPTION**

OF THE

# **Union Steam and Water Heating Co's APPARATUS,**

*For Warming and Ventilating Private Residences and  
Public Buildings.*

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### **BOILER.**

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THE entire apparatus is located in the basement or cellar where is erected a steam generator or boiler, made of cast iron in separate sections, each a complete boiler in itself, so that by using a greater or less number of these sections. the capacity of the boiler will be increased or diminished to adapt it to the size of the building to be warmed. This, with its necessary appurtenances, is so constructed in substantial brick-work that we secure not only the power of heating up quickly and thoroughly, but, what is very desirable in warm weather, the ability of maintaining a gentle heat, by means of its external radiating surface, without assistance from the radiators, which insures the greatest economy in the consumption of fuel. The simple construction of our Boiler, and the fact that the fire is entirely surrounded by water, (except at the grate), makes it perfectly safe from accident by fire. The pressure of steam under which the apparatus operates is limited to three pounds per square inch, at which limit, by the automatic regulator, the draft-door is closed, rendering

the further accumulation of steam impossible. As an additional security, a safety-valve is attached to the boiler, by which, at all times, all the steam that rises above the given pressure of three pounds can escape. From the steam generator or boiler the steam is conveyed through small wrought iron pipes to our

### **PATENT STEAM RADIATOR,**

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Which is also made of cast iron, and so constructed as to increase the external surface to fully three times the extent of the inner, so that the heat is liberated at a much lower temperature than the steam inside, imparting to the air a soft and genial warmth, without robbing it of its natural moisture or otherwise injuring it.

By the application of this invention we produce an atmosphere surpassing in healthfulness that generated by any other mode of warming, and overcome the pernicious effects produced by hot-air furnaces, and steam in coils of pipes. The pure fresh air from the outside is warmed by contact with these radiators placed in chambers especially provided therefor in the basement or cellar, and located directly under the rooms to be warmed, and is thence conveyed by means of flues and registers to the different apartments, each receiving its own separate and independent column of steam-warmed air.

### **OUR DRAFT REGULATOR.**

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When a sufficient pressure of steam has been obtained (say one pound for ordinary weather), it immediately operates on the automatic regulator, shutting the draft-door, and con-

sequently checking the fire and the increase of steam. When by condensation this pressure is released, the draft door again opens, the fire and steam increase, until the pressure is again obtained. The most careful servant by constant watchfulness could not hope to excel the quickness and delicacy with which this automaton answers every call for *more or less* heat; thus constituting itself a great economizer of labor and fuel.

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### **OUR SELF-ACTING AIR VALVE**

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Is attached to each table or stack of radiators, which allows free egress to the air, and permits the steam to enter, and so make its heat available, as air and steam cannot at the same time occupy the same space.

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### **ECONOMY OF FUEL.**

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We are confident that our apparatus as now constructed,—insuring the most perfect combustion and saving the heat from the hot-water circulation of the boiler—the perfect regulation and control of the draft by our automatic regulator, causing the fire to burn only as the demand for heat is required, and at the proper moment invariably checking such draft—the water from the steam returning very hot to the boiler, requiring but a little heat to reconvert it into steam—renders it in point of economy the most desirable Heating Apparatus in use.

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### **OUR APPARATUS IS MORE DESIRABLE THAN ANY OTHER.**

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The materials of which it is composed will not oxidize as readily as other materials used for the same purpose in other

modes of steam heating—while the fact that the fire is entirely surrounded by water, precludes the possibility of its burning out, as in the case of hot-air furnaces.

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### **VENTILATION.**

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As heated air has a tendency to ascend, and the noxious gases caused by respiration and exhalations from the skin, are heavier than vital air and settle to the floor, it follows that a true ventilation will be caused by having vents near the floor which draw off the vitiated atmosphere and cold air, and allow the warm air to sweep the floor. No better ventilating flue can be had than the ordinary chimney, and of this we always avail ourselves when we can; if not, we insert flues especially for the purpose. The construction of our apparatus and its action on the atmosphere, bringing in a continuous supply of fresh warm air, produces a circulation which renders the ventilation complete and thorough.

The public are respectfully invited to call and examine, at our office, a complete apparatus in operation, fully illustrating every point of construction.

The engraving on the third page shows our heater as erected in substantial brick-work.

### CAST-IRON RADIATOR FOR WARMING THE AIR.



THE increased outer surface of this Chamber reduces the imparted heat so as not to injure the air passing over it. Steam at its lowest temperature is  $212^{\circ}$ , which is a heat that injures the atmosphere and deprives it of its moisture. This injurious heat, necessarily received by the inner surface of the chamber, is reduced by the increase of the outer surface to less than  $200^{\circ}$ , affording a temperature that does not change the condition of the atmosphere, but leaves it healthy and agreeable after warming.

The merit of our radiator may be understood when compared with the radiating surface of the hot-air furnace, which is raised to a temperature of  $800^{\circ}$  or  $1000^{\circ}$ . By this excessive heating the vitality of the air is destroyed, and it is turned into a noxious gas unfit for respiration and destructive of human life.



*STACK OF RADIATORS ARRANGED FOR USE,*

receiving steam from the boiler, and warming a current of fresh air from outside the building.

The air current passed through this system of radiators is thoroughly heated, for the reason that the current is so sub-divided that no air can pass through without coming in contact with the heated surface.

## CIRCULAR.

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AFTER the test our apparatus has sustained the past seven Winters, we are enabled to speak with great confidence of our ability to please our customers. In comfort, convenience, economy, and the completeness with which our apparatus secures the two great results at which it aims, *sufficient warmth and thorough ventilation*, it stands unrivaled. As the quality of the heat is the same from hot water and low pressure steam, it is a matter of indifference which we use; the whole question with us is reduced to the single point—which on the whole does its work most complete and economical. Both have valuable properties peculiar to themselves. *Hot water*, slow, of limited range, but enduring—excellent for mild weather. *Steam*, expansive and able to multiply itself to any extreme of temperature. Sometimes we find a house so constructed that portions of it can be warmed with one, the balance with the other, but in most cases we can combine the two, thus securing the best qualities of each; and after years of close observation and extensive trial, we are satisfied that no other plan will so successfully meet the extremes of our climate, and comfortably warm our homes, as this. In no direction has improvement been more rapid than in the adaptation of steam for warming our homes. The ill constructed, worse contrived, wasteful, noisy, and complicated high steam apparatus, is fast giving place to the simple, durable and economical apparatus we present to your attention,

as safe and easily managed as the tea-kettle on your kitchen fire, and to which the skill of our ordinary help is amply sufficient.

The character of the heat is now well understood to be so superior to the best constructed hot-air furnaces, and to the various direct and indirect radiating steam apparatus, where coils of pipe are used, as to admit of no favorable comparison. The much greater amount of radiating surface required to obtain this mild, healthy heat, of course is greater in its first cost than the *hot-air* furnace. But if all the advantages which our apparatus has over the furnace, be embraced in the question of economy, it will be decided in our favor. Its great durability, its economy of operation—avoiding loss and damage to house and furniture, occasioned by the dry and dusty heat of the furnace—the increased health and cheerfulness of your family—for be it well understood that a heat which spares not house nor furniture has but little mercy on the health—commend it to public favor.

That our success has been complete, and entirely satisfactory to our customers, is shown by their testimony, and we call attention to the fact that a number of the letters are from persons familiar with the use of steam and other heating apparatus. We think the judgment of these competent and experienced men will be most satisfactory to those seeking information, and we ask attention to the testimony given of the superiority of our apparatus in its simplicity and economy of operation; in its great durability; in its superior ventilation and equality of heat; in its entire freedom from gas and all unpleasant qualities, which make it most acceptable to invalids; in its freedom from the liability of having the heat thrown back from parts of the house by the variations of the current of air outside, as we avoid the use of long, horizontal air-pipes;

in its uniformity and great flexibility, meeting the requirements of mild weather by its hot water surface without steam, and of the coldest weather by the two combined.

Houses already warmed by hot-air furnaces can be adapted to the use of our steam apparatus.

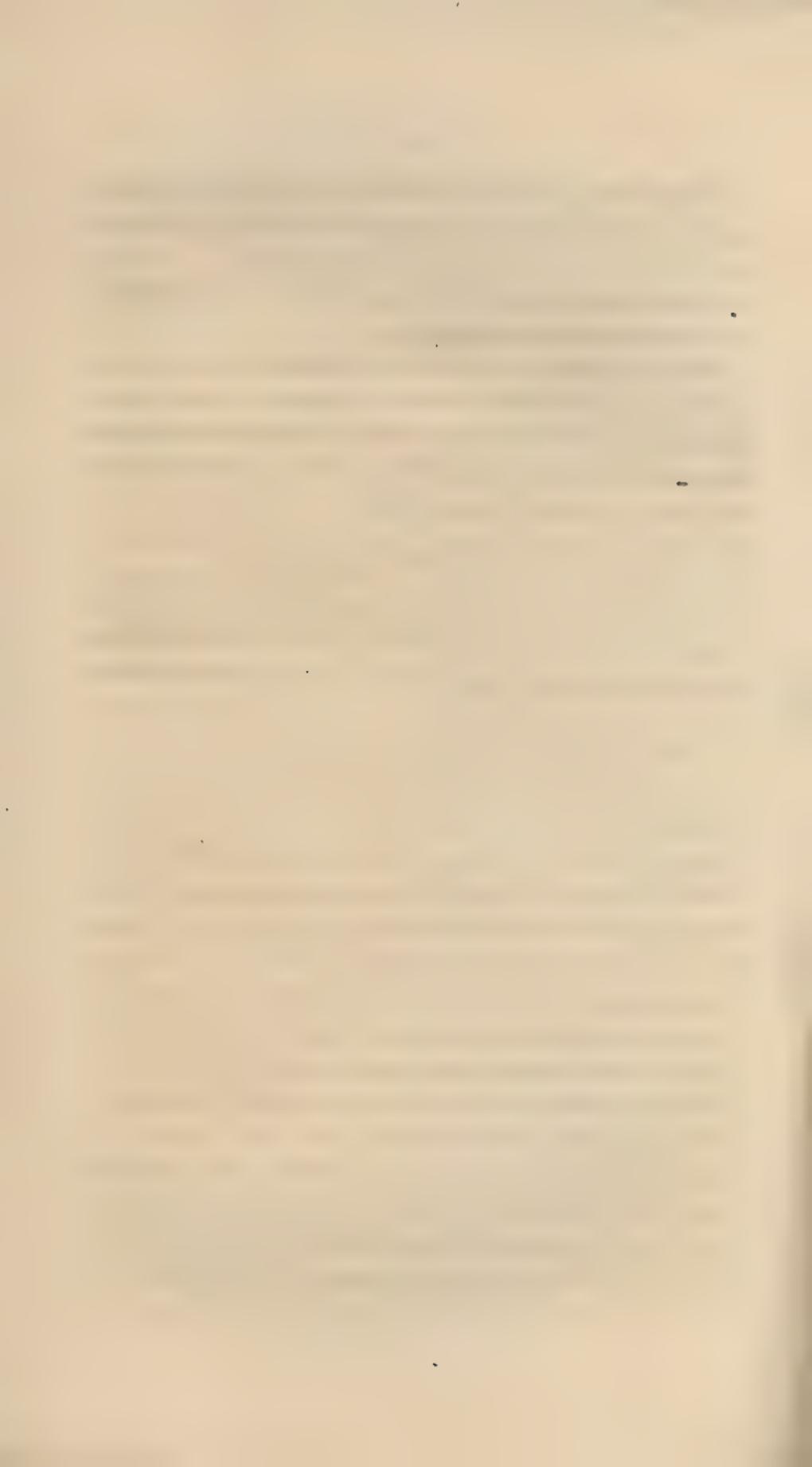
Persons expecting to have this Apparatus, will do well to order soon, as experienced labor is required for their proper erection, and the crowding of orders in the fall, always endangers the work being slighted in the hurry, or our ability to do it at all for want of proper help.

MURRAY & WINNE,

114 Dearborn St. Chicago.

MURRAY, WINNE & BAILEY,

St. Louis, Missouri.



# TESTIMONIALS.

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## CERTIFICATES OF PROMINENT ARCHITECTS IN CHICAGO AND OTHER PLACES.

*Chicago, April 24th, 1865.*

Messrs. MURRAY & WINNE,—*Gentlemen:*—Having had an opportunity the past Winter to see the working of your Union Steam and Water Heating Apparatus in several buildings which have been erected under my supervision, and without any exception have proved most satisfactory. Its safety from fire, and quality of heat, combined with proper ventilation, far exceeds any system of warming I have ever had the opportunity of introducing. I most heartily recommend its introduction for buildings of any considerable size.

Most respectfully, your ob't servant,

WM. W. BOYINGTON, *Architect.*

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*Chicago, March 24th, 1866.*

Messrs. MURRAY & WINNE,—*Gents:*—Having used your Heating Apparatus in my house during the past two Winters, and also having observed its operation in a number of dwelling-houses which I have erected and superintended, I take great pleasure in bearing my unqualified testimony, as to its superiority over every other mode of heating with which I am acquainted. The superior quality and volume of the heat, compactness and durability of construction, perfect freedom of danger from fire, economy of labor in attending to it, and of fuel, when a moderately large house is to be heated. It also affords facilities for ventilation not obtainable in other modes of heating. To any one wishing to warm their buildings well, I would recommend the Apparatus of Messrs. Murray & Winne, it having proved itself all they claim for it.

Respectfully,

E. BURLING, *Architect.*

*Chicago, April 24th, 1865.*

Messrs. Murray & Winne's Union Steam and Water Heating Apparatus embodies the correct principles for warming and Ventilating buildings never before obtained in any system, and is far superior to any mode I have ever examined.

Yours truly,

O. L. WHEELOCK, *Architect,*

*New York, January 23d, 1865.*

I am well acquainted with the Union Steam Apparatus used by the Union Steam and Water Heating Co., which has been invented by Mr. Gold. I have had a good opportunity of comparing it with the other methods of steam heating, viz: by wrought-iron pipes and wrought-iron radiators, and consider his cast-iron radiator superior to either of the above in durability and in economy. It is unquestionably, therefore, the most perfect Heating Apparatus at present in use.

JAMES RENWICK, *Architect.*

*Brooklyn, March 30th, 1864.*

UNION STEAM AND WATER HEATING COMPANY.—Being acquainted with the construction of Gold's Patent Improved Steam Heater, and the practical working of the same, I, therefore, recommend it to all who desire to have their buildings warmed by a pure and wholesome atmosphere.

S. B. LEONARD,  
*Architect and Superintendent Brooklyn Public Schools.*

*Boston, March 25th, 1866.*

UNION STEAM AND WATER HEATING CO.,—Gentlemen:—The Steam Heating Apparatus which you put into my house three years ago, has worked to my entire satisfaction, and is, in my opinion, far superior to any furnace that I have yet seen. It is easily managed, gives a summer-like heat over the whole house, and burns *less coal* than the ordinary furnace: for these reasons I have adopted its use in several buildings erected by me, in all of which they have given satisfaction.

Yours respectfully,

NATHANIEL J. BRADLEE, *Architect,*  
No. 5 Tremont Street, Boston, Mass.

*Testimonial from the President and Superintendent of the Board of Education of New York City.*

*New York, March 2d, 1864.*

This is to certify, that, as Superintendent of School Buildings under the Board of Education of the City of New York, I have been obliged to have a constant and familiar experience for some years past with the warming of the same, and I take pleasure in giving my unqualified testimony to the superiority of the Apparatus of the Union Steam and Water Heating Company. In durability, economy of fuel, simplicity of management and ability to furnish a full supply of pure air to all parts of the building, rendering them healthy and comfortable, even in the coldest weather, it leaves nothing to be desired. The buildings, among the large number of roomy and often exposed structures, used for our school purposes, that are the best warmed, are those having this Apparatus.

*Yours, &c.,*

*A. McVEY.*

*New York, April 14, 1865.*

While President of the Board of Education, my attention was called to the Apparatus of the Union Steam and Water Heating Co., and I fully concur in Mr. McVey's recommendation.

*WM. E. CURTIS.*

*Certificate of J. W. Bulkley, Superintendent of Public Schools, Brooklyn, N. Y.*

*Office of City Superintendent, }  
Brooklyn, Feb. 3, 1865. }*

MESSRS. MURRAY & WINNE,—Gentlemen:—During the last ten years we have used a variety of Apparatus in heating our School-Houses, but none gave satisfactory results until the introduction, within the last three years, of your Union Steam and Water Heating Apparatus. It is now in use in several of the School-Houses and gives very general satisfaction. This Apparatus is easily managed; free from all danger; generates a very pleasant atmosphere, and affords better ventilation and more equable heat than we have ever used. In the quality of air, the amount of heat, the ventilation secured, its adaptability to public school buildings, its freedom

from danger in use, and easy management, your Apparatus is superior to any other that has come under our observation. We cordially give our recommendation to the same.

J. W. BULKLEY,  
*City Superintendent of Public Schools.*

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*A valuable testimonial from A. B. Clark, Principal of Public School No. 13, Brooklyn, N. Y.*

*Brooklyn, N. Y., Jan. 26, 1865.*

MESSRS. MURRAY & WINNE, CHICAGO, ILL.—Gentlemen—I have pleasure in being able to state to you that the Heating Apparatus introduced by your Company into School-House No. 13, proves to be a complete success. This house, the largest in the city, has been warmed during the past three or four seasons with it, and so warmed as to afford the fullest satisfaction to both teachers and pupils. Our experience in teaching of over twenty-five years, has brought me in contact with all methods employed in warming School-Houses, but in my opinion, none of them are fit to be named in comparison with it. The whole plan is as philosophical as it is ingenious. It furnishes an adequate and continuous supply of pure air, which is made to serve its customers but *once*, when by an admirable system of ventilation it passes off, giving place to a fresh supply. The atmosphere, while undergoing the process of discipline and preparation for active service in the School-Room, in no case comes in contact with iron castings or contrivances heated to redness, by which it is scorched, and inevitably converted into a deleterious gas, but is brought to a pleasant and healthful temperature, by Radiators so arranged as to raise no fears or anxieties on a point of so much importance to both teachers and pupils. Its action has all of promptness and safety and uniformity that could possibly be desired, while on the score of economy it compares favorably with any other Heating Agent. In addition to the excellent qualities above mentioned, of the heat generated by this Apparatus, I must not fail to name one other, which, in my estimation, is all important; it is this—the warmed air is neither so dry nor so light as that produced by other modes of heating, consequently more readily fills the entire room, warming the *heels* as well as the *heads* of those who would

share its advantages, consequently we hear no complaints of cold feet, with head-aches in the same breath. Finally, I cannot refrain from urging upon those who have the educational interests of our youth in charge, to give this method of supplying warmed air to their School-Rooms a fair trial; test it in your own dwellings. I am satisfied the results will fully verify the most enthusiastic expressions in its favor.

Very truly, A. B. CLARK.

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*Worcester, Mass., May 18, 1864.*

UNION STEAM AND WATER HEATING CO.—Gentlemen:—This is to certify that I have used your Steam Heater one season in the house and dormitories connected with my school, and can speak in high praise of its efficiency, and saving of fuel.

C. B. METCALF,  
*Principal of Highland Military School.*

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*Testimonial from the Superintendent of the New York State Inebriate Asylum.*

*New York State Inebriate Asylum,  
Binghamton, April 5th, 1865. }*

MESSRS. MURRAY & WINNE,—Gentlemen:—The Union Steam and Water Heating Company put one of their Heating Apparatus in the New York State Inebriate Asylum last summer. The *past cold winter* has fully tested its heating capacity. We cannot speak too highly or too strongly of its good qualities. It will not be stating too much when we declare that no Heating Apparatus has yet been invented which will compare with it, for softness of heat and pureness of air.

Yours respectfully,

J. EDWARD TURNER, M. D.

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*Certificate from the Chairman of the Building Committee of the Burd Orphan Asylum, Philadelphia, Pa.*

*Philadelphia, March 8th, 1865.*

TO THE UNION STEAM AND WATER HEATING CO.,—Your Apparatus, now in full operation at the Burd Orphan Asylum, has, during

the past winter, given entire satisfaction. The atmosphere in all the rooms is, by your peculiar ventilating arrangements, pure, wholesome and most agreeable. The Asylum Buildings are on an eminence, and exposed on all sides to the winter winds; they are difficult to warm, consisting as they do of separate buildings, connected by corridors, and yet the temperature throughout the whole extent is warm and most comfortable, and gives great satisfaction to the officers and inmates of the institution. The chapel with its open arched, timbered roof, exposed to the east and north-east, is well and sufficiently heated. In order to give you whatever advantage you desire from this certificate of your Heater's success, I attach a lithographic sketch of the Asylum, showing the construction and exposure of the building.

Very respectfully, EDWARD SHIPPEN.

*Extract from the Report of Chairman of the Board of Managers of the Hartford Retreat.*

A very decided improvement has been made in the mode of warming the centre building, by the introduction of a Steam Heating Apparatus, which proves entirely successful. The temperature of all the offices and rooms, including the chapel on the fourth story, was never before so comfortable and pleasant, or the air so free from noxious gas or impurities of every kind. Among the recommendations to which this Apparatus is entitled, is its perfect security against fire, as no part of the radiating surface is heated to more than  $215^{\circ}$ , which can neither endanger any combustible material or vitiate the atmosphere by unduly heating portions of it, as is the case in the hot air furnace. We regard it as important that other apartments in the institution should be warmed and ventilated in the same manner.

S. S. WARD, *Chairman.*

*Certificate of the Superintendent of the Hartford Retreat.*

*Hartford Retreat, May 24th, 1864.*

UNION STEAM AND WATER HEATING CO.—Gentlemen:—Your Steam Heater was placed in the center building of this institution last autumn. This building is four stories high and fifty feet square.

The entry through the center is wide and open to three stories square. The chapel occupies the fourth story. Your Apparatus has succeeded to our entire satisfaction, and has accomplished all that you promised. The building has been comfortably warmed during the whole winter and for the first time. We have had no difficulty in obtaining the right temperature, and the air has at all times been soft, genial and healthy. There cannot be, of course, from your Apparatus, any of that dryness or burning of the air (the result of its coming in contact with red hot iron,) or that deleterious mixture of dust, gas, &c., so injurious to health and so uncomfortable. I give you an extract from the report of the Chairman of the Board of Managers. Yours truly,

JOHN S. BUTTER, M. D., *Superintendent.*

*Testimonial from the Committee and Superintendent of Public Buildings regarding the new City Hall, Boston, Mass., one of the largest and finest buildings in the United States.*

Boston, Sept. 1, 1865.

B. F. CAMPBELL, AGENT UNION STEAM AND WATER HEATING CO., —*Dear Sir:*—It gives me pleasure to be able to signify to you the satisfactory results thus far attending the use of the Steam Warming Apparatus placed by you in the new *City Hall*, now in process of completion in this city.

The fires were lighted in the latter part of October, and the Apparatus kept in operation until the spring; during the whole of which time, this spacious building, containing some eleven hundred thousand cubic feet of space, was comfortably and abundantly warmed, enabling the artisans to prosecute their work without those hinderances or accidents which often result from a lack in this respect.

The members of the Building Committee have had occasion repeatedly to notice the exceedingly agreeable quality of the atmosphere within the building, which, in our judgment, is due to the judicious construction and arrangement of your Steam Heater, producing a volume of heated air, both generous and unfailing in supply and pure in quality, and, at the same time, avoiding those com-

mon discomforts which arise from the escape of smoke, coal-gas, dust, &c., into the apartment.

I am confident that the Apparatus will give much satisfaction to the members of the city government and others for whose use it is intended, and that it will prove to be fully in keeping with the other appointments of this excellent building.

Respectfully yours, DANIEL DAVIES,

*Chairman of Committee on Public Buildings.*

UNION STEAM AND WATER HEATING Co.,—Gentlemen:—It gives me much pleasure to be able to say, that the operation of the “warming and ventilating apparatus,” of which B. F. Campbell, Esq., is the Superintendent, has been entirely satisfactory in our City Hall the past season, so that the entire building has been kept perfectly comfortable with not more than four-fifths the amount of steam we have had at our control, and at the same time avoiding all the inconveniences that are liable to arise from the use of heaters generally.

Very respectfully, your ob't serv't,

JAS. C. TUCKER,

*Sup't of Public Buildings.*

Boston, April 5th, 1866.

*Testimonial from Dr. Kirkbride, Superintendent of Pennsylvania Hospital for the Insane.*

Penn'a Hospital for the Insane,  
Philadelphia, March 4, 1865. }

MESSRS. JAS. P. WOOD & CO., AGENTS, UNION STEAM AND WATER HEATING CO.,—Gentlemen:—During the past winter, we have had one of Gold's Patent Steam Heaters in use, under the North Museum and Reading Room of this Institution, where it has given entire satisfaction. We have found it very easily managed and economical in the use of fuel.

Respectfully yours,

THOMAS S. KIRKBRIDE, M. D.,

*Physician in Chief and Superintendent.*

*The Commissioner of the Land Department, Illinois Central Railroad, after several years experience in the use of high Steam gives the following endorsement of our system of Heating.*

*Land Department, Illinois Central Railroad Co.,  
Chicago, March 30, 1866. }*

MESSRS. MURRAY & WINNE,—Gentlemen:—The Steam Heating Apparatus you erected in this Building last summer has worked to our entire satisfaction during the severe winter just passed. The great advantage of your system over any other plan of heating, either by steam or furnace, is in the quality of the air, being entirely free from gas and other impurities which make the use of Steam pipes and Coils in rooms so objectionable. *Between this plan and your own the question of superiority is so plain as to admit of no comparison.*

Yours respectfully,      W. M. PHILLIPS.

*What the Philadelphia and Reading Railroad Company think of our Apparatus.*

*Philadelphia and Reading Railroad Company,  
Phoenixville, March 8, 1865. }*

UNION STEAM AND WATER HEATING CO.,—Gents:—In reply to the letter concerning the Heater placed in the new Depot at this Station by your Company, I need not say to you that we have just passed through a very severe winter, one of unusual character for this section of the country, and that the Heater has more than met our expectations. I would recommend your Apparatus for use in all public and private buildings, as being the best system of heating now in use.

Yours truly,      N. M. ELLIS, Supt.

*Certificate of Hartford and New Haven Railroad Company.*

*Office of Hartford and New Haven Railroad Co.,  
Hartford, Conn., Feb. 11, 1865. }*

UNION STEAM AND WATER HEATING CO.,—In reply to your inquiry as to the working of the Steam Heating Apparatus furnished by you for the new office building of this company, I have only to say that it has given perfect and entire satisfaction. In the coldest weather it has furnished all the heat required for twelve rooms,

and would probably heat as many more. It consumes much less fuel, and being self-regulating requires less care and attention than ordinary furnaces. And as proof that it has remained perfectly tight in all its steam joints, we have used it three weeks at a time, not adding water to the boiler, and with no perceptible loss in the quantity it contained. I have no doubt that for large buildings and first-class dwellings it will soon supersede all other modes of heating. We are certainly well satisfied; and if there are any who doubt its being the best thing in use, we would be glad to have them call here on a cold day, and give it an opportunity to speak for itself.

Yours respectfully,

E. M. REED, *Sup't.*

*Certificate of E. B. McCagg, Esq.*

Chicago, February 27, 1866.

MESSRS. MURRAY & WINNE, of this city, removed from my residence an ordinary Hot Air Furnace, and replaced it with their Union Steam Heating Apparatus, which I have had in use two winters. It has given me unqualified satisfaction in every respect, and is not equalled by any Heater that I have ever examined, in these two most important points—quality of air, and abundant and direct ventilation.

E. B. McCAGG.

*Testimonial from Geo. R. Whitman, Esq., of the firm of Bowen Bros.*

Chicago, March 30, 1866.

MESSRS. MURRAY & WINNE,—*Gentlemen:*—I have used your Steam Heating Apparatus for warming my house during the past severe winter with unqualified satisfaction. It is perfectly safe, easily managed, and not extravagant in the consumption of fuel, and affords a soft, pleasant and agreeable atmosphere. I consider it superior to any other mode I have ever seen for warming and ventilating.

Yours respectfully,

GEO. R. WHITMAN.

*Testimonial of Perry H. Smith, Esq., Vice President North-Western Railway Co.*

Chicago and North-Western Railway Co.,  
President's Office, Chicago, Feb. 28, 1866. }

MESSRS. MURRAY & WINNE,—*Gentlemen:*—The Union Steam Heater which you put in my house I have had in use during two winters,

and am pleased to say has given me and my family perfect satisfaction. It has furnished a pleasant and uniform temperature throughout my house, in extreme cold weather as well as mild weather, and the quality of heat generated, and the circulation and ventilation caused by the action of the heater, are such as to commend it to all who study the health and comfort of their families. In fact it is the perfection of heat and ventilation. Regarding it the best invention for warming my house, I cheerfully recommend it to others, expressing the opinion that no one will regret the expense of procuring one when he experiences the comfort and economy which it ensures.

Respectfully yours,                    P. H. SMITH.

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*Chicago, March 7, 1866.*

MESSRS. MURRAY & WINNE,—*Gents:*—I have had your Union Steam and Water Heating Apparatus in use in my house two winters, and am pleased to say that in my judgment it is unquestionably far superior to anything of the kind which has yet been presented to the public. The heat produced is delightful and abundant, and entirely free from all the unpleasantness of the heat of a Hot Air Furnace. It is easily managed, requires little attention, consumes coal moderately, and is perfectly safe. I can only add, that I would not dispense with it for double its cost.

Yours, very truly,                    J. F. PIERSON.

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*Chicago, April 10, 1866.*

MESSRS. MURRAY & WINNE,—*Gentlemen:*—It affords me very great pleasure to state that the Union Steam Heating Apparatus you placed in my store two years ago has given me complete and perfect satisfaction in *every* particular. It has been in constant use during two *severe* winters, and the store, (though having a large glass exposure and located on a corner,) has been uniformly comfortable, and the atmosphere most delightful. I most heartily commend it as being perfectly safe, easily managed, (in fact it regulates itself,) *remarkably economical in fuel*, supplying a pure and balmy atmos-

phere, and free from the annoyances of dust and gas. Those who study their own health and comfort will surely avail themselves of this system of Heating.

Yours truly,      EDWARD ELY.

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*Recommendations of S. D. Kimbark, and Geo. M. Kimbark, Esqs.,  
of the firm of Hall, Kimbark & Co.*

Chicago, March 21, 1866.

MESSRS. MURRAY & WINNE,—Gentlemen:—Having unsuccessfully tried to warm my house with two different Hot Air Furnaces, I substituted your Union Steam and Water Heating Apparatus which you put in my house last season; and now after the experiences of the past severe winter, am pleased to say, that at all times the heat has been abundant, and of a most delightful and healthy quality.

I consider the Apparatus superior to any other mode I have yet seen for warming and ventilating.

You are at liberty to refer to me on this subject.

Yours truly,      S. D. KIMBARK,  
195 So. Water St.

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Chicago, March 20, 1866.

MESSRS. MURRAY & WINNE,—Gentlemen:—The Steam Heating Apparatus you put in my house on Michigan Avenue last season I have had in use the past winter, and am satisfied that for durability, safety and comfort it is unequalled by any system of warming that I have ever examined. It gives me pleasure to add my testimony in its favor.

Yours truly,      GEO. M. KIMBARK.

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*W. F. Coolbaugh, Esq., President of the Union National Bank, gives his experience with our Apparatus, thus:*

Chicago, March 22, 1866.

MESSRS. MURRAY & WINNE,—Gentlemen:—After a winter's trial of your Steam Heating Apparatus, I am pleased to say that it has worked very satisfactorily, affording an ample supply of warm air, pure and healthful, and free from all smell of coal-gas and other impurities. It seems to be easily managed, and from the character

of the work and materials used, must be very durable, and I regard it the best mode of heating with which I am acquainted.

Yours truly, W. F. COOLBAUGH,  
No. 6 Park Row.

*Chicago, April 2, 1866.*

MESSES. MURRAY & WINNE,—*Gentlemen*:—I have used your Steam Heating and Ventilating Apparatus during the past severe winter.

The purity of the atmosphere generated by your Apparatus, and the admirable ventilation which it facilitates, are alone sufficient to render it valuable to those who appreciate those luxuries.

You are at liberty to refer to me on this subject.

Yours truly,S. C. GRIGGS.

**Recommendation of Lyman Blair, Esq., of the firm of Culbertson, Blair & Co.**

MESSRS. MURRAY & WINNE,—*Gentlemen*:—Having substituted your Steam Heating Apparatus in my house in place of an ordinary Hot Air Furnace, and having had it in use the past severe winter, I am prepared cheerfully to recommend it as the best system of warming and ventilating I have ever seen. The heat from it is abundant, and very soft and balmy, entirely free from the dryness, as well as the smoke and gas of ordinary furnaces, and it seems to me for these reasons must be more conducive to health. It is perfectly safe in every respect, durable in construction, and easily managed.

Yours very truly,

## LYMAN BLAIR.

Peter Schuttler, Esq., who has the finest Private Residence in the West gives us the following letter.

*Chicago, March 31, 1866.*

MESSRS. MURRAY & WINNE,—*Gentlemen:*—After two years trial of your Steam Heating Apparatus I am pleased to say that I regard it the best system of warming and ventilating now in use.

You are at liberty to refer to me at any time.

Yours respectfully, PETER SCHUTTLER.

*Chicago, March 26, 1866.*

MESSRS. MURRAY & WINNE,—I commenced changing the internal arrangements of my house and building an addition thereto, last October, and have had constantly in use ever since the Steam Heating Apparatus you erected there at that time. I most cheerfully bear testimony to its complete success, for though the mechanics have been constantly at work all winter plastering, painting, &c., and the doors and windows have been open a great deal, yet during the entire time my house has been abundantly warm, and my family perfectly comfortable. It works very handsomely, and is a great household comfort, as well for the simplicity of its construction, its safety and cleanliness, as for the soft, even, and summerlike quality of the atmosphere it generates, and its *great economy*. I regard it the most desirable mode of warming a Dwelling, particularly in a climate so changeable in its temperature as that of our city. I am perfectly satisfied with it in every particular.

C. B. GOODYEAR.

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*The Chicago Republican of April 3rd, 1866, says:*

“We have used the apparatus of MESSRS. MURRAY & WINNE, the past season, to warm our counting-room, job office, and printing room, and speak what we do know from our own experience, that in abundance of heat and in quality of atmosphere, it surpasses anything we have ever seen for warming and ventilating. We consider their cast-iron radiator far superior to coils of pipe, for the pleasant quality of air they generate, their noiseless action, and their durability.”

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*Recommendation from the Building Committee of the First Baptist Church, the most elegant and costly Church Edifice west of New York City.*

*Chicago, March 31, 1866.*

MESSRS. MURRAY & WINNE,—Gentlemen:—In building the First Baptist Church Edifice near the corner of Wabash avenue and Hubbard court of this city, it was our aim to make it as complete in all its appointments as possible, and one of the most difficult problems we had to encounter was the matter of properly heating and ventilating. It was the impression of the Building Committee

that too little attention had been given throughout the country to the subject of Heating Church Edifices, and we made it our business to ascertain and adopt the most approved system in use without reference unduly to cost. After careful investigations and comparisons of the different modes, your mode recommended itself most strongly and was adopted by the Committee. The trial thus far has met our most sanguine expectations. The atmosphere heated by your apparatus is superior to any that I have known in similar rooms heated by other processes. The operation of your apparatus is simple, efficient, safe, and so far as I have been able to judge, during the period we have used it economical in the consumption of fuel. With the heating there is also secured a pleasant and successful ventilation. I believe it to be conducive to health and comfort, and cheerfully recommend it as well adapted to churches and large assembly rooms.

Respectfully yours,      CYRUS BENTLY,  
*Chairman of the Building Committee.*

I concur in the above opinion as another of the Committee.

CHAS. DUFFIELD.

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*Chicago, April 6, 1866.*

MESSRS. MURRAY & WINNE,—*Gents:*—It affords me much pleasure to add my testimony in favor of your valuable Steam Heating Apparatus. After a careful trial of your Apparatus through the past severe winter, I am prepared to say it gives me entire satisfaction. I find the great volume of warm air introduced is pure and uninjured, so that my family are almost unconscious of the presence of artificial heat; and the temperature of my house extremely agreeable. It is entirely free from dust and the pernicious gases which annoyed us while using the Hot Air Furnace you removed from my house. I regard it durable in its construction, and recommend it for its cleanliness and economy. I look upon your mode of heating as a great luxury, and I heartily wish you the success your exertions and your valuable Apparatus entitles you to.

Very respectfully yours,      FREDERICK TUTTLE.

*Testimonial from Hon. Wm. Bross, Lieutenant Governor of the State of Illinois.*

April 9th, 1866.

MESSRS. MURRAY & WINNE,—Gentlemen:—I was satisfied by a careful examination, that your Apparatus embodied the correct principles for warming and ventilating, and so adopted it for use in my house, in place of a Hot Air Furnace, with a result that is very gratifying.

Instead of the dry, burnt air, and noxious gases we received from the Furnace, we have enjoyed during the past severe winter a pure, pleasant and healthy atmosphere, which is equally diffused throughout the house. I regard it the most complete and economical mode of heating in use, as well for the desirable quality of atmosphere it generates, as for the simplicity of its construction and the safety and convenience of its arrangements. I therefore commend it to the favorable consideration of the public.

Yours respectfully,

WM. BROSS.

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*Certificate of N. S. Bouton, Esq., a practical and experienced man, one of the proprietors of the "Union Foundry Works."*

Chicago, March 30, 1866.

MESSRS. MURRAY & WINNE,—Gents:—Having now thoroughly tested your Steam Heating Apparatus through two winters I cheerfully testify to its merits. Since the changes in my chimney so as to give a good draught, the Apparatus has worked in all respects entirely satisfactory. The house has been well warmed throughout. I find it also economical of fuel, using only about eight (8) tons of hard coal through the season. It is easily tended, less trouble than an ordinary furnace, and the fire did not go out from October till March.

Truly yours,

N. S. BOUTON.

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Chicago, March 28, 1866.

MESSRS. MURRAY & WINNE,—Gentlemen:—Having vainly attempted to warm my house with a Hot Air Furnace, I was induced by the experience of some of my friends in the East, who have had it in successful operation there several years, to introduce your Steam Heating Apparatus; and now after an experience with it myself of

two winters in this rigorous climate, am pleased to say that it has given us unqualified satisfaction, keeping our house warm throughout, even in the severest weather, with an atmosphere at once pure and pleasant. I believe it to be the safest, most economical and durable Heating Apparatus at present in use.

Yours truly, ANDREW BROWN.

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*Chicago, March 23, 1866.*

MESSRS. MURRAY & WINNE,—*Gentlemen:*—It affords me pleasure to inform you that notwithstanding the severity of the past winter, your Steam Heating Apparatus has operated very satisfactory. Although the Hot Air Furnace I removed when I adopted your Steam Apparatus, was of modern and approved construction, the air from it was not agreeable or healthy, and it failed to warm my house. For the first time the house has been perfectly comfortable the entire season, with the interior doors standing open as in summer. Its chief value, however, in my opinion is its capacity to produce a pure, healthy and delightful atmosphere which diffuses itself readily throughout the entire house. I recommend it for its cleanliness as we have no annoyance from dust, coal-gas or smoke. It is easily managed and entirely safe.

Very truly yours,

L. B. BOOMER.

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*Testimonial of U. H. Crosby, Esq., regarding the warming of his Opera House.*

*Chicago, March 31, 1866.*

MESSRS. MURRAY & WINNE,—*Gentlemen:*—The Heating Apparatus erected by you to warm the Opera House, has given us good satisfaction, warming at such times as desired, the Auditorium, Stage and Dressing rooms.

The atmosphere being uninjured by warming, and the superior ventilation caused by the action of your Apparatus makes this in our opinion the most comfortable building of its kind in the country.

Yours respectfully,

U. H. CROSBY.

*Recommendation from J. B. Sickles, Esq., of the firm of J. B. Sickles & Co., St. Louis, Mo.*

*St. Louis, Mo., April 5, 1866.*

MESSRS. MURRAY, WINNE & BAILEY,—*Gentlemen:*—I have used your Steam Heating Apparatus the past winter, and take pleasure in saying that it has given myself and family entire satisfaction. My house has been thoroughly warmed at all times with a pure and summer-like atmosphere, entirely free from impurities of *gas, dust and smoke.*

I consider it the most perfect mode of warming and ventilating yet introduced, and could not be induced to dispense with it.

Truly yours,

J. B. SICKLES.

*Mr. Wheelock, of Janesville, Wis., applying to the Union Steam and Water Heating Co., for the erection of an Apparatus in his dwelling, took occasion to enquire of H. S. Durand, Esq., as to his experience in the use of the Apparatus, receiving the following reply:*

Office of H. S. Durand,  
Milwaukee, Jan. 29, 1866. }

W. G. WHEELOCK, Esq., Janesville,—*Dear Sir:*—Your note of the 20th inst., reached me at Racine, on Saturday evening. In reply will say that the Steam and Water Heater, put into my house by Murray & Winne, of Chicago, is the finest heating and ventilating Apparatus ever yet introduced. It performs to a charm, and gives us perfect satisfaction. It warms directly five rooms below, four of them are about 17 x 19 feet and fourteen feet high, and one parlor 19 x 27. The lower halls 10 x 40, and 10 x 19 feet, and a narrow hall 5 x 12 feet, all fourteen feet high. The main stair case and upper halls, same size as below, and two chambers, 17 x 19 feet, all twelve feet high. It also warms, indirectly, three large chambers, so that it will warm seventeen large rooms or more.

The air is fresh and delightful as summer; no gas or dust, or no burnt air. In the very coldest weather this winter, it would keep the mercury at 70° above zero. It diffuses the heat uniformly. The only fault is, it is too hot. In way of fuel I think it will consume during the entire cold weather, ten tons of Anthracite Coal, but warms double the space of any furnace (*i. e.* hot air,) in the world. I would not exchange it, for use, for all the hot air furnaces

in Wisconsin. It is self-regulating, more easily attended than a common coal stove, and is perfectly safe, a child can take care of it. It is very substantial, and I see no reason why it should not last thirty years or longer. . . . Truly yours,

H. S. DURAND.

*Recommendation of Pittsburgh, Fort Wayne & Chicago Railroad Co.*

*Superintendent's Office, P. Ft. W. & C. Railroad,  
Ft. Wayne, Ind., March 31, 1866.* }

MESSRS. MURRAY & WINNE, Chicago,—Gentlemen:—We have had your “Union Steam and Water Heating Apparatus” in use in our office building at this place for over a year. In that time it has been thoroughly tested and I can safely say, *it has given full satisfaction.* We find it economical in regard to fuel, effecting a considerable saving over the ordinary methods of heating. Its simplicity renders the matter of attention to it very easy. In this respect we have had no difficulty. The heated air generated is purer and fresher than any I have ever noticed either from stoves, furnaces, or steam in coils of pipe. In this particular I think your Apparatus superior to any I have ever seen.

I do not know what more to say in regard to the Heater, except that we all like it, and can cheerfully recommend it as a most excellent arrangement for heating public or private buildings.

Very respectfully yours,

CHAS. E. GORHAM,

*Sup't West'n Div'n.*

*Recommendation of Charles Ridgely of N. H. Ridgely & Co., Bankers, Springfield, Illinois.*

*Springfield, Ill., March 26, 1866.*

MESSRS. MURRAY & WINNE, Chicago,—Gentlemen:—Your Heating Apparatus put up in my house the past season has proved very satisfactory in its operation. It commends itself beyond any Furnace I have ever seen by the superior quality of the heat generated; by its increased safety from fire and economy in the use of fuel. It is also easy to operate. I cheerfully recommend it to every one who wishes a well warmed house.

Yours respectfully,

CHARLES RIDGELY.

*Certificate of Wm. Kraus, Esq., Cincinnati, Ohio.*

*Cincinnati, Ohio, February 27, 1865.*

S. M. PIKE & Co., Agents, UNION STEAM AND WATER HEATING Co.,  
*Gents:*—I consider the Union Steam and Water Heating Apparatus  
 you put into my house as superior to all other Heaters in quality of  
 atmosphere produced, it being balmy and summer-like, and per-  
 fectly healthy, ventilating as well as warming; and of great economy  
 in fuel.

Yours,

WM. KRAUS,

288 Fourth Street.

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*Milwaukee, Wis., March 27, 1866.*

MESSRS. A. C. PATTERSON & Co., Agents, UNION STEAM AND  
 WATER HEATING Co.,—*Gentlemen:*—In answer to your enquiries  
 respecting the Steam and Water Heater put into my new house, by  
 your firm, last fall, I am compelled to admit that it is the most  
 perfect thing in my house. For diffusing a general, thorough and  
 summer-like heat throughout the entire building, it cannot be sur-  
 passed. Added to which is a perfect system of ventilation which  
 cannot be obtained by any other system. The minor advantages  
 are freedom from Ashes, Dust, Dirt and Gas.

The simplicity of its construction, and its capacity to take care of  
 itself, when in use, and perfect security from fire, are additional  
 recommendations in its favor. In comparison with other modes of  
 heating, I firmly believe it should reduce the rates of insurance at  
 least twenty-five per cent.

Sufficient inducements to persuade me to take it out cannot be  
 offered. It will certainly contribute largely to the health, happiness  
 and pleasure of those who are fortunate enough to secure it.

Respectfully yours,      F. J. BOSWORTH.

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*Milwaukee, Wis., March 27, 1866.*

MESSRS. A. C. PATTERSON & Co., Agents, UNION STEAM AND  
 WATER HEATING Co.,—*Gentlemen:*—In reply to your enquiry of  
 how we like the Steam and Water Heater which you put in my  
 father's residence in this city, I would say, that it is by far the most  
 perfect Heating Apparatus of which we have any knowledge. The

heat is uniform, and as fresh as summer, and the ventilation perfect. It is simple and easily managed, and in all respects far exceeds our expectations.

I cannot speak too highly of it, and think no residence should be built without one.

Yours truly,      EDWARD P. ALLIS.

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*Milwaukee, Wis., March 26, 1866.*

MESSRS. A. C. PATTERSON & Co., Agents, UNION STEAM AND WATER HEATING CO.—*Gentlemen:*—I have used your Steam Heating Apparatus the past winter, and take great pleasure in saying that it has given myself and family unqualified satisfaction. My house has been thoroughly warmed at all times with a pure and delightful atmosphere, and I most cheerfully recommend it for its safety, cleanliness and remarkable economy.

Yours truly,      N. BRICK.

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*Milwaukee, Wis., March 26, 1866.*

MESSRS. A. C. PATTERSON & Co., Agents, UNION STEAM AND WATER HEATING CO.—*Gentlemen:*—We have used your Steam Heating Apparatus (put into our dwelling last fall) with the most satisfactory results. The atmosphere generated is much like summer heat, free from impurities of Gas, Dust and Smoke; consequently, we have not suffered from head-ache, as we usually do with other modes of heating, where the air is burned and robbed of its vitality. We consider it the most healthy and the best mode of heating and ventilating, and cheerfully recommend it to all who desire health and economy.

Respectfully yours,      KELLOGG SEXTON,  
MARY F. SEXTON.

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*Cincinnati, Ohio, April 7, 1866.*

MESSRS. S. M. PIKE & Co., Agents, UNION STEAM AND WATER HEATING CO.—*Gentlemen:*—The Union Heater you put in my house last fall has been fully tested since its completion, and I have no hesitation in saying that both the quality and quantity of heat furnished has been entirely satisfactory. In regard to the amount

of coal used I believe that we formerly burned as much in one of our grates in the Parlor or Sitting Room as we now do in the Furnace to warm five Rooms and two Halls. It is easily managed, the saving of labor being very great, while it is much safer than open fires. My family think it indispensable.

Very respectfully yours,      S. L. SNODGRASS,  
No. 99 Dayton St.

*Cincinnati, Ohio, April 6, 1866.*

MESSRS. S. M. PIKE & Co., Agents, UNION STEAM AND WATER HEATING Co.—*Dear Sirs:*—The Union Steam and Water Heating Apparatus put up in my house by you last fall has worked remarkably well, and I have no doubt it will be generally used in this city when once well understood.

Yours truly,      WALTER SMITH,  
118 Broadway.

*Philadelphia, March 6th, 1865.*

MESSRS. JAMES P. WOOD & Co., Agents UNION STEAM AND WATER HEATING Co.—*Gentlemen:*—I take pleasure in recommending the Steam Heater which you placed in my house, No. 1102 Spruce St., in 1863. For the two winters it has been in use, we have really enjoyed a pleasant summer heat throughout the dwelling, which we never experienced before.

*In point of economy of fuel, I think 20 per cent. is saved, and its management perfectly easy, entirely under the control of the domestics, and without danger. Another advantage: I have not spent one penny in repairs since its erection.*

Yours very respectfully,      HENRY B. TATHAM.

*Boston, Sept. 1st, 1864.*

B. F. CAMPBELL, Esq., Agent UNION STEAM AND WATER HEATING Co.:—The Steam Heating Apparatus you put into my house, on Mount Vernon Street, we have used the past winter to our perfect satisfaction. We have had an abundance of very soft, mild heat; and our house has been so comfortable, that, if we did not see winter outside, we should not know of its presence. We have had no gas

or dust from the Apparatus. *The amount of coal used, has been very small for so large and uniform an amount of heat.* Though the first cost is large, I do not consider that as anything in comparison to the advantage gained.

Very truly yours, M. DAY KIMBALL.

No. 65 Mount Vernon Street.

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*Important Recommendation from I. D. Russell, Esq., of Russell & Erwin, Manufacturing Co.*

New York, June 15th, 1865.

UNION STEAM AND WATER HEATING CO.—Gentlemen:—I wish to express my entire satisfaction with the Union Steam and Water Heater you erected in my house last fall. It has been a great comfort to my family. My house was never so uniformly heated before, and I am satisfied that with *less coal* I can heat it much more uniformly and comfortably than with the hot air furnace. The use of the boiler surface in connection with the radiators I think a great improvement, as it was sufficient to warm my house during the mild weather without the use of steam—the combination enabling us to use the Heater in the mildest weather, and ample for the coldest. I was agreeably surprised to find it much less trouble to take care of than my hot air furnace. I think that with its soft, pleasant and uniform heat, easy management and *economy of fuel*, it needs only to be known to find general acceptance with our citizens.

Yours truly,

I. D. RUSSELL.

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*The opinion of Edward Cooper, Esq., N. Y., as to the durability, advantages of Cast Iron Boiler and Radiators over Wrought Iron Boiler and Coils of pipe.*

New York, August 2d, 1865.

UNION STEAM AND WATER HEATING CO.—Gentlemen:—After a trial during the last winter of the Steam Heater you put into my house last fall, I take pleasure in saying that it worked to my entire satisfaction. I think your Apparatus has some advantages over any other steam heater with which I am acquainted. For a given power its first cost is less, and it is more quickly repaired, although I think the repairs will be less than where a wrought iron boiler and

pipes are used. There is a less volume of water in your boiler than in the other heaters, which enables the heat of the furnace to be modified more rapidly when desired, the boiler itself acting as heating surface for the air. I find that often in moderate weather I can get heat sufficient from the hot water in the boiler without getting up steam.

Yours truly,

EDWARD COOPER,

*No. 8 Lexington Avenue.*

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For want of space we are unable to insert many valuable certificates of parties to whom we have permission to refer. Among them are such names as

Hon. Wm. B. Ogden, Chicago.

George Sturges, Esq., Cashier N. W. National Bank, Chicago.

S. M. Nickerson, " "

Hiram Wheeler, " "

Albert Sturges, " of Solomon Sturges' Sons, "

A. D. Tittsworth, " "

J. Q. Hoyt, " "

Harry Fox, " of Fox & Howard, "

S. J. Surdam, " "

S. L. Keith, " "

J. L. Scripps, " "

Wm. B. Keen, " "

Geo. F. Bissell, General Agent Hartford Insurance Co., "

A. H. Miller, Esq., "

E. H. Shelden, " "

G. S. Hubbard, " "

R. Emerson, Jr., Esq., Rockford.

John W. Minturn, of Grinnell, Minturn & Co., New York.

J. B. Varnum, Jr., Grammercy Place, "

Wm. E. Dodge, Jr., of Phelps, Dodge & Co., "

Peter Cooper, "

Sheppard Homans, Esq., "

Geo. A. Hoyt, Esq., Pres't Penn. Coal Co., "

Joseph W. Howard, Esq., "

G. A. Conover, Esq.,	New York.
Josiah O. Low, Esq., of A. A. Low & Bro.,	"
James Roosevelt, Esq.,	"
John L. Aspinwall, Esq.,	"
E. C. Litchfield, Esq.,	"
P. Murray, Cashier American Exchange Bank.	"
Bank of New York, Wall St.,	"
Ocean Bank,	"
D. T. Brown, M. D., Bloomingdale Insane Asylum,	"
Wm. E. Curtiss, Esq., Pres. Board of Education,	"
Rev. D. C. Van Norman, Rutgers Female Inst.	"
John P. Treadwell, Esq., St. Nicholas Hotel,	"
James O. Morse, Esq.,	"
Robert. M. Olyphant, Esq.,	"
Public School No. 7, 174 W. 10th St.,	"
" " 47, 38 E. 12th St.,	"
" " 41, W. 104th St.,	"
" " 51, 519 W. 44th St.,	"
" " 85, W. 18th St., near 6th Av.,	"
Cyrus P. Smith, President Board of Education, Brooklyn, N. Y.	
Public School No. 8, Middagh St.,	"
" " 11, Washington Av.	"
" " 18, Degraw St.,	"
" " 17, corner N. 5th St.,	"
Kings County Court House, City Hall Square,	"
Dr. J. G. Holland, Springfield Republican, Springfield, Mass.	
Oliver Ditson & Co., No. 227 Washington St., Boston, Mass.	
Ticknor, Fields & Co., Tremont St.,	"
Boston & Worcester Railroad Co.,	"
Eastern Railroad Co.,	"
Boston & Providence Railroad Co.,	"
Adams Express Co.,	"
New City Hall,	"
Horticultural Buildings,	"
Wm. Chadbourne, Esq., Commonwealth Av.,	"
Wm. T. Andrews, Esq.,	"
J. L. Little, Esq.,	"

Chas. H. Dalton, Esq., Commonwealth Ave., Boston, Mass.		
J. Stetson, Esq.,	"	"
Dr. W. Brown,	"	"
O. Sawyer, Esq.,	"	"
H. S. Gookin, Esq.,	"	"
H. Whitwell, Esq.. 61 Beacon St.,		"
Matthew Baird, Esq., No. 814 Broad St., Philadelphia, Penn.		
Henry B. Tatham, 1102 Spruce St.,		"
E. W. Clark & Co., Bankers, 25 South 3d St.,		"
Charles T. Yerkes, Girard Avenue,		"
Charles Sautee, 534 N. 6th St.,		"
J. Dutton Steele, Chief Eng'r Reading R. R.,		"
State Capitol, Harrisburgh, Penn.		
Jay Cooke is introducing it into his elegant new mansion, the finest private residence on the Continent.		
Hon. Samuel Hanna, V. Pres. P. Ft W. & C. R. R., Fort Wayne, Ind.		
J. A. Gardner, Chief Engineer, do., Fort Wayne, Ind.		
Chas. E. Gorham, Gen. Superintendent, do., Fort Wayne, Ind.		
Convent of the Visitation, Wheeling, Va.		
Conn. Historical Society, Hartford.		

**POINTS OF EXCELLENCE OF THE UNION  
STEAM AND WATER HEATING  
APPARATUS.**

The most prominent advantages of our improved apparatus, considered both with reference to its construction (or *mechanically*), and with reference to its action in warming (or *philosophically*), are the following:

***The Sectional Construction of the Apparatus.***

The sectional construction of both boiler and radiator gives our Heater a manifest superiority over all other steam heating apparatus; its effect being to reduce the construction

of all dimensions of heaters to the employment of the requisite number of elementary parts, of which all the boilers and condensing chambers are made up.

### ***The Material of its Construction.***

Our improved heater is made of *cast iron*; a consideration of great importance, since, beside costing less, it has the following points of superiority over wrought iron:

*First.* As a radiator of heat it is *twenty per cent.* better than wrought iron.

*Second.* When exposed to oxydation in cellars and other damp localities, *it is more than twice as durable as wrought iron.*

*Third.* Cast iron is more conveniently given such form, that the outside surface of a chamber shall be two or three times greater in extent than the inner surface. This is essentially necessary, in the manufacture of condensing chambers or radiators, as used in our Apparatus; which receive the heat at a certain temperature and deliver it at a lower.

### ***The Simplicity and Effectiveness of the Automatic Regulator.***

This is one of the most important features in the construction of warming apparatus, as upon it depends, not only the economical consumption of fuel, but, frequently, the safety of the entire apparatus.

The Automatic Regulator is of the most simple construction, receiving its impulse from the pressure of steam in the boiler to close the draft door, when the required pressure is exceeded in the slightest degree, and then if the supply of steam be in excess of the demand, opening the flue door and causing the draft to pass OVER the fire; in fact, being always ready like a watchful sentinel to adapt combustion to the temperature of the atmosphere to be warmed.

***Construction Favoring Employment of very Low Steam.***

Our Apparatus admits of a lower pressure of steam being used, from the fact that the radiators are constructed with large steam chambers, throughout which the least pressure is sufficient to cause the steam to circulate. If the steam channels were small, a higher pressure of steam would be required, as is the fact where small pipes in coils are used, and the steam caused to go in a zig-zag course, following one channel to the end. Whereas, in this system the steam being received at once into a large chamber, it has but a short distance to go, and but small obstruction to overcome in passing to the radiating surfaces. This fully meets the objection that such low steam as is used in our apparatus cannot be rendered available in properly warming buildings of large size.

***The Facility for Imparting Heat Given by the Increased Surface of the Radiators.***

To this quality may be attributed, to some extent, the effectiveness of very low steam, as employed in our Heater, as a means of warming buildings of any dimensions. The increased surface of the radiator serving to effect the contact of a greater number of particles of the atmosphere at the same time; whereby the heat is more rapidly carried off. The arrangement of this extension causing a detention of the air upon the heated surfaces; by which the main current is broken, and heat imparted rapidly and thoroughly to the several secondary currents thus formed.

***The Impossibility of Communicating Fire from this Apparatus.***

A glance at the engravings illustrating the construction of our Apparatus will show at once that no fire can escape from

its chamber. The conducting pipes can never attain a temperature much above  $215^{\circ}$ , at which degree no injury can be done to any wood work with which they may come in contact. The heat of the chambers containing the condensers will at all times be less than the degree above stated. So that, under no circumstances, can fire be communicated to a building warmed with this apparatus.

The importance of this security against fire may be estimated, when the reports of the Fire Marshal of New York state that *two-thirds* of the fires in that city are traceable to the use of *hot air furnaces*, and that such is the increase of accident from this cause, that *the fire insurance companies have been obliged to raise the rate of insurance on buildings warmed by hot air furnaces; and have recently agreed to make a REDUCTION of premium where Low STEAM HEATERS are exclusively used:*

#### *The Absence of all Danger of Explosion.*

The low pressure of steam used in our Apparatus, which the Automatic Regulator and escape valve effectually prevent from being exceeded, is a complete safeguard in this particular, the use of this Apparatus being no more dangerous than an ordinary tea-kettle as regards danger from explosion.

#### *The Radiators Impart Heat to the Atmosphere at such a Degree as not to Impair its Vitality.*

This is the great merit of our Apparatus, and one which *gives it a decided advantage over all other heaters*, whether they be *Hot Air, Hot Water, High Steam, or Low Steam* apparatus.

All other heaters give the heat to the atmosphere at about the same temperature at which it is received, and therin consists the impossibility of warming the air without impairing its qualities, by any such apparatus.

Our system *reduces* the heat after reception by the radiator, and before it is delivered to the atmosphere, to such a low degree, that while it effectually warms the air, *its vitality is unimpaired*. Thus fully accomplishing the great physiological *desideratum* in the art of artificial warming.

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### **OUR APPARATUS PECULIARLY FAVORABLE TO PROPER VENTILATION.**

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An investigation of the physiological laws governing the proper regulation of the atmosphere of dwellings and other buildings, has shown that the air of an apartment must be constantly changed, in order that it may be taken into the lungs without injury to organic life. The air introduced being of course, pure and fresh, properly warmed, and yet retaining all its vitality.

The rapidity with which the exhalations from the lungs will vitiate the atmosphere, and render it unfit for respiration, may be understood from the fact that, according to the opinions of the best authorities, a single individual will in one minute vitiate three and a-half cubic feet of air.

The use of our system of warming will insure the introduction of air in the proper condition into the apartment. It only remains, therefore, to provide, in connection with this apparatus, a suitable manner of regularly freeing the building from the impurities due to the exhalations of the lungs and skin, and other unavoidable contaminations of the atmosphere, to furnish the human family with the means of preserving the atmosphere of their dwellings in a mild, genial condition, and entirely free from all the slow and insidious poisons that constantly undermine the human frame.

The construction of our Heater, and its action on the atmosphere, renders buildings warmed by this Apparatus susceptible of a better system of ventilation than is favored by any other construction of heater. For the simple reason, that by our system the air enters the apartment in its natural state; not being unduly rarified by loss of moisture and derangement of its gases, from contact with highly heated surfaces, as in other systems.

This permits the fresh air to diffuse itself evenly through the apartment, producing a circulation which causes the heavier air, laden with the impure gases, to pass off by suitable outlets in the lower portion of the room; the atmosphere being thus at all times preserved in a pure, healthful condition, as favorable to the support of human life as that breathed beneath the broad canopy of heaven.

This action of the Heater, favoring as it does, superior ventilation, is due to the valuable improvement in the construction of the condensing chambers, whereby the heat is reduced after its reception by the inner surface of the chamber, and imparted to the atmosphere at a temperature not liable to injure it. This being the *only apparatus* which tempers the heat imparted to the requirements of the atmosphere.

In erecting the apparatus, due advantage is taken of the facility it gives for ventilation, though, in every case, locality and other circumstances determine the precise means to be used for this purpose.

Without pretending to compete with the many cheap and worthless apparatus before the public, we can state, that in consequence of the many improvements in the construction of this apparatus, favoring economy of erection, we are able to furnish this Heater complete, at a *less cost than any other steam or hot-water apparatus.*



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### **LILLIE'S NATIONAL BANK SAFES.**

NOTWITHSTANDING Lillie's Bank Safes have been used for years all over the United States, and hold a vast portion of the money of the country, not one of them has ever been robbed.

Lillie's Duodecagon Bank Lock and Monitor Safe Lock have never, in any instance, been picked or opened by "Lock Experts" or Burglars, and are emphatically the triumphant locks of America.

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